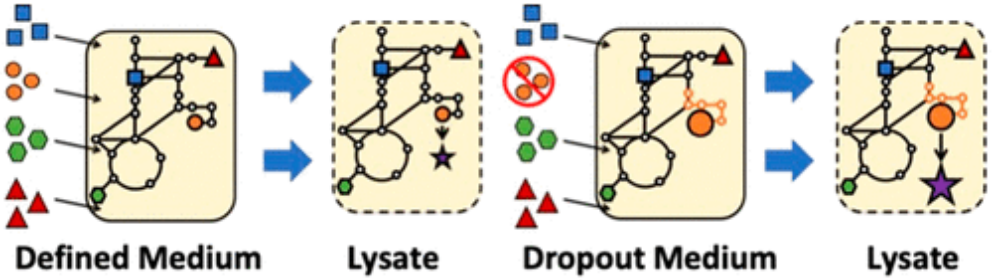
Foundational Genomics Research, PMI SFA



Novel Approach: Developing a systems approach to cell-free metabolic engineering

Objective	• Develop a systems approach, using defined media conditions and –omics measurements, to effectively engineer bacterial proteomes for cell-free metabolic engineering applications.
New science	• Shotgun proteomic analyses are effective for refining media conditions that lead to focused metabolic activity in cell extracts and enhanced yield of a desired product. • The one-pot, in vitro biosynthesis of phenol from glucose was demonstrated via the activation of a 25-step enzymatic reaction cascade. • A more than 6-fold increase in phenol yield is possible through simple manipulation of growth conditions.
Impact	• The described approach provides a framework for harnessing the metabolic potential of diverse organisms for cell-free metabolic engineering applications.

Mohr, B, Gianonne, RJ, Hettich, RL. and Doktycz, MJ. Targeted Growth Medium Dropouts Promote Aromatic Compound Synthesis in Crude E. coli Cell-Free Systems. *ACS Syn Bio* 2020 *9(11):v2986 – 2997*. DOI: 10.1021/acssynbio.9b00524.